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THE TRANSPORTATION PROBLEM IN THE BITUMINOUS COAL INDUSTRY

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The first evidence of difficulty in the transportation of bituminous coal is a coal car shortage,—that is, an inability on the part of the railroads regularly and adequately to meet the demands of the mines for empty cars in which to load and ship their production to market. Coal car shortages have been so serious and so nearly continuous for the past four years that there is a tendency to forget that the situation previously was just the reverse. For many years prior to the late summer of 1916 there customarily existed in this country a surplus of cars available for coal loading in excess of all demands therefor, almost 90 per cent of the time. The occasional coal car shortages were strictly seasonal and local; nation wide or long continued difficulties of this sort were unknown.

The seasonal and local car shortage is the result of a sudden and heavy demand for coal which comes late each summer in anticipation of, and is later accentuated by, the arrival of cold weather. The cure of such difficulties is more with the consuming public than with the producers and carriers. The former may, with little if any loss, purchase and store their extraordinary winter's coal requirements, in part at least, earlier in the season, when mine and transportation facilities are not as a rule fully utilized. But the latter, in effecting a cure, must mine and transport with even greater intensity during the period of strong demand. This would require larger investment in mining and transportation equipment and more employees in those industries; and this is something to be avoided where possible, and certainly in the bituminous coal mining industry. On this point no argument is needed beyond the very first conclusion announced in the recent report of Mr. Hoover's Committee on the Stabilization of the Bituminous Coal Industry of the American Institute of Mining and Metallurgical Engineers.

If the future held in store no more serious problems in bituminous coal transportation than those customarily met with prior to 1916, the subject could be dismissed as not of particular importance. But our experience since 1916 has been distressing, and at times attended with danger. That experience warrants serious consideration of its causes, and the best endeavors of all concerned to eliminate those causes henceforth.

GENERAL EFFECT OF THE WAR

War is essentially a consumer of iron and steel, and iron and steel production depends mainly on coal, coke, ore, and fluxing materials as

the basic raw commodities. Moreover, fuel is relatively a greater factor in iron and steel production than in most other lines of manufacture. The shift from peace to war industry called for extraordinary coal production long before we entered the war, and our activity as a bel-ligerent greatly increased this demand. Simultaneously came greater demands for the other basic commodities of iron and steel production. All these commodities are invariably shipped in bulk and usually and by preference require open-top cars, commonly called coal cars, for transportation.

The territory Chicago, St. Louis and east thereof, and north of the Ohio and Potomac Rivers, is the great workshop of our country. It is the location of by far the greater part of our population, and the greatest density of population and traffic. If to its bituminous coal production is added that of the bordering states of Virginia, West Virginia, and Kentucky, largely consumed in this great workshop, we account for fully 75 per cent of our total bituminous production. In this territory are located our great centers of iron and steel manufactures, producing perhaps 80 per cent of all our iron and steel articles. On its Lake Erie shore are the docks over which the regions beyond the lakes obtain their annual requirements of twenty-five to thirty million tons of coal and in return send their double quantity of ore. On its North Atlantic Coast are great tidewater coal piers transshipping millions of tons of coastwise and export coal, both anthracite and bituminous, annually. There also are located the ports through which, first for convenience, and later for convenience and necessity, was handled most of the tremendous overseas movement of men and materials from 1915 on. And throughout this period, freight and troop movements within and to and from this territory, east, west, north, and south, were conducted on lines of railroad never built to carry this concentrated load, and claimed by the owners to have been stunted in development during several years preceding by hostile, or at least unwise, policies of government regulation. Furthermore, many of the more important gateways through which this war traffic had of necessity to move, were manufacturing cities of major importance in the war program, which were then undergoing great industrial expansion and development, without contemporaneous development of their railroad facilities. Nothing, perhaps, more clearly emphasizes the stress in this territory than the action of the War Industries Board, toward the close of actual hostilities, designed to effectually limit any further location of industry in the eastern portion thereof.

It would be just criticism of this paper to say that thus far many words have been used to outline a situation which the French sufficiently describe by a shrug of the shoulders and the comment, "C'est la

guerre." The truth is that the war was the primary cause of our coal transportation difficulties, and as indicative of this, note the trend of bituminous coal production in the United States in recent calendar years:

1910.....	417,111,000	net tons
1911.....	405,907,000	" "
1912.....	450,105,000	" "
1913.....	478,436,000	" "
1914.....	422,701,000	" "
1915.....	442,622,000	" "
1916.....	502,523,000	" "
1917.....	551,791,000	" "
1918.....	579,386,000	" "
1919.....	458,063,000	" "
1920 (Est.).....	542,000,000	" "

This is the commodity of greatest tonnage handled on our railroads and 75 per cent of it is produced and transported in the congested territory already described.

What has been said heretofore constitutes, in the opinion of the railroad man, the basis of a complete defence against the untrue charge so often made that "the railroads broke down" during the war. Perhaps nothing has contributed so much by way of ostensible support of this charge as the oft-repeated statements and advertisements of gross coal car shortages at the mines. There were coal car shortages, to be sure, and their effects were at times serious, but the blame therefor lies at no one door. Accepting the war as the primary cause, it is profitable to study the supplementary causes right down to date, with some consideration of how to eliminate them in the future.

THE WAR DEMAND AND ITS RESULTS

Bear in mind that for some years before our war activity commenced the bituminous coal mining industry in this country was much overdeveloped. Financial conditions within the industry were by no means good and competition was exceedingly keen. Two rather lean years just before we hit our stride in war manufacturing did not, of course, better this situation. The market was chronically a buyer's one. The light demand and low production in these preceding years left no great stocks in consumers' hands upon which to play in undertaking our new industrial venture. A strong demand for coal came very quickly and by midsummer 1916 reached extraordinary proportions for that time. The war load was then well upon our railroads, and the demands for service required such continuous use of facilities as did not allow the desired opportunity for conditioning the same. Then began also the difficulties of the roads in obtaining additional equipment, due to the preëmption of industry first by more profitable

and later by what was deemed more essential work. But under the conditions as they then obtained the 1916 bituminous production went over 500,000,000 tons, even with a late start; and such coal car shortages as developed were as a rule peculiarly the result of particular situations incident to expansion of production on certain lines not favorably placed to handle the same.

Under these circumstances, with no control over the marketing of bituminous coal except that afforded by the law of supply and demand, the inevitable happened. By the beginning of 1917 we were in a period of rapidly mounting coal prices, while contemporaneously there came to Washington, in ever-increasing numbers, consumers whose very industrial life depended on regular and adequate coal supply and who found great difficulty in obtaining it. Statistics to show currently the true state of production, distribution, consumption, and stocks were utterly lacking, as indeed, is largely the case even today. There was, however, an undeniable shortage of cars at the mines and quite naturally the whole difficulty was attributed to this railroad disability.

Looking back at the production of 550,000,000 tons in 1917 and 580,000,000 in 1918, with stocks upwards of 25,000,000 tons at all times and reaching 63,000,000 tons on Armistice Day, it is easy to deduce that while the difficulty could have been cured by more transportation, permitting greater production, it might also have been cured largely and perhaps entirely by more economic distribution by the coal operators. That uneconomic distribution was at least a factor in the trouble was clearly shown by the nature of the demands made upon the railroads, and by the large stock piles of different consumers in different places. Admitting them to be extreme cases, it may be cited that one lot of Illinois coal, which does not ordinarily move east of Toledo and Detroit, went to the amount of 200 cars to Connecticut, while a coal car shortage on a southwestern railroad was found to result from shipments to the Twin Cities and beyond, whereas the normal market never went north of Omaha. Of the crosshauling of coal and the carriage of "coal to Newcastle" there was almost continuous evidence, although their exact extent could not be ascertained without the most thorough and complete policing and checking of the entire coal movement.

There was further waste of rail transportation, particularly in the bituminous coal movement to New England—one of the danger spots—because of the dislocation of ocean transportation. The Fuel Administrator for New England was not far wrong when he stated that removing coal-carrying vessels from coastwise service was equivalent to pulling up a four track railroad to his section. New England cannot be fueled all-rail any more than can our northwestern lake states. In-

stead of maximum ocean and minimum rail movement of bituminous coal to New England, we found ourselves by force of circumstances, in 1917 and early 1918, attempting the reverse. The rail gateways were incapable of handling what was attempted, and even so, the extraordinary use of such gateways for coal, of necessity, adversely affected other war movements. Furthermore, a car of bituminous coal moving to New England all-rail requires at least double the car-days necessary to handle the same tonnage to New England rail and ocean. To those circumstances must be largely attributed the failure to protect New England more adequately in the winter of 1917-18. And right here it may be noted that throughout this last year, New England, to escape foreign competition in the purchase of tidewater coal and ocean freight rates which greatly exceed rail rates, has leaned more and more on all-rail coal.

Nor was it possible to control distribution through the medium of our regulation of interstate commerce. The cardinal principle of that regulation is that carriers' rates, rules, regulations, and practices shall be just, reasonable, and not unduly discriminatory as between persons, places, and commodities. To be sure, the Interstate Commerce Commission early lent its support to the Council of National Defense and the Railroad War Board in their joint endeavors to cope with the situation. Always, however, there was before the carriers the statutory prohibition against undue discrimination, and the consequent possibilities of heavy suits for damages. There was, of course, much done by "strong arm" methods where the end justified such means, and late in the year 1917 when the National Coal Association came into being as the organization of the coal producers, considerable assistance was possible through that source, especially as price regulation had then become a government policy.

REGULATION UNDER WAR LEGISLATION

The well-intentioned efforts of Secretary of the Interior Lane in the spring of 1917 to settle the price situation by coöperative action of the operators unfortunately came to nothing. It was not until August, 1917, with the effectiveness of the Lever Law and the Transportation Priority Act, that anything like order began to come out of the chaos. Even then, the Fuel Administration during the first several months of its existence was, as can be said in all fairness and without personal criticism, little more than an unwieldy machine; and what control it had of distribution resulted not so much from the exercise of its own powers and its control over the coal operators as from its ability to compel obedience to its requirements, by virtue of its ability through the Railroad War Board to effect some control of transportation.

The Transportation Priority Act, however, was immediately put to excellent service. One of the real danger spots in the 1917 situation had been the light movement over the Great Lakes for the protection of the territory beyond. This was immediately given attention by the President's Priority Commissioner and the situation was so well handled that during the trying winter of 1917-18 not a single case of coal shortage was recorded in the northwestern lake territory. As a second exercise of his powers, the Priority Commissioner again furnished great impetus in the right direction by authorizing certain preferences to coal in the use of so-called coal cars. This increased production simultaneously justified the consequential discrimination against the shippers of other commodities.

A suggestion early made to the Fuel Administration was that the movement of bituminous coal be zoned in such manner as to afford more economical distribution, both from the standpoint of war requirements and transportation possibilities. These efforts, although backed by the Council of National Defense and the Railroad War Board, were of no avail. Fortunately, the suggestion met with favor at the hands of the Railroad Administration shortly after it took hold. The immediate result was a prompt and careful study of the whole situation by a committee of both administrations on the basis of the original suggestions of the Council of National Defense and the Railroad War Board. The Committee recommended, and, effective at the beginning of the coal year April 1, 1918, there was promulgated a zoning scheme which stood the test of the remainder of the strict war period. This greatly increased the ability of the railroads to transport bituminous coal and facilitated proper distribution. Shortly afterward the Railroad Administration, exercising its extraordinary powers, made even more stringent rules than had previously existed, preferring coal in open top cars. These new conditions, coupled with the more effective organization and efforts of the Fuel Administration, were responsible for the 1918 figure of 580,000,000 tons production. It has frequently been said that had the armistice not intervened production for that year would have reached 600,000,000 tons. The fact is, however, that the saturation point had been reached in some sections before the armistice, and it may be doubted whether production would have been maintained after that date at anything like the high rates established before, even had hostilities continued.

COAL CAR SUPPLY DURING THE WAR PERIOD

It will be profitable here to give consideration to some of the transportation features of the situation which faced the country in 1916, 1917, and 1918, and under which maximum, and in fact, reasonably

adequate, coal production was obtained for the country as a whole even though there was habitually throughout that period the cry of coal car shortage at the mines.

So far as the records of the coal loading railroads of this country permit such a comparison, it appears that on January 1, 1916, they were serving 3646 mines with an established rated capacity of 43,524 cars per day. Of these, 190 mines were undergoing what is known as development. On January 1, 1917, the total mines served by the railroads numbered 4916, with an established daily capacity of 55,158 cars; 358 of these mines were in the development stage. On January 1, 1918, the mines served numbered 6157, with a rated capacity of 59,968 cars daily; 840 of these mines being counted as developing. All mines included in this comparison are established tippie mines,—mines which have a permanent arrangement at the location of the mine itself for loading coal over a tippie into cars. So-called wagon or country bank mines, which are of a temporary nature but in a period of strong demand for coal frequently number two or three thousand, are not included. An outstanding feature of the comparison is that in 1917 and 1918, two years during which there was no regulation of prices and distribution until the last five months, the number of tippie mines increased almost 70 per cent, and their capacity in the neighborhood of 40 per cent. Expressed another way, the average capacity per mine per day on January 1, 1916, was about twelve cars, whereas, on January 1, 1918, it was less than ten cars. Although the established mines had during these two years been developing to even greater capacity, the multitude of new mines was enough to bring down the average capacity per mine. This in itself meant a waste of transportation.

For many years coal loading railroads have, in times of shortage, distributed the available cars to mines daily on the basis of their established rated capacity. One of the achievements of the Railroad Administration was the establishment of uniformity of practice on all roads in this respect. Common carriers are not equipped to handle all peak loads currently. This fact and the development of the bituminous mining industry far beyond maximum requirements of the country inevitably means a car shortage during such peak demands as have been made since 1916. Every increase in development of the industry, without corresponding increase in demand for product and railroad facilities, of necessity means that the available cars must be distributed to more mines in a lower ratio to established rated capacity. Expressed in another way, more mines must be served with the same number of cars in order to get from all mines in the aggregate the same tonnage of coal that could be produced by fewer mines served with more cars per mine. The point to be borne in mind is that even with a coal

car shortage, and with a pronounced coal car shortage, it is entirely possible to keep the country fully and adequately supplied with coal.

The weekly reports of the Geological Survey enlighten us as to this. It is to be regretted that the data furnished the Survey as the basis of its reports is only about 60 per cent complete, but relying as it must upon the good will and coöperation of the coal operators, and without any law back of it, the Survey has been able to report week by week a fairly accurate figure showing the percentage of full time worked and the percentage of full time lost at the bituminous mines, for various named causes. Applying to the tonnage produced weekly the percentage of full time worked gives an idea of the potential capacity of the mines, and this furnishes some rather startling indications of the overdevelopment of the industry. Judged by these reports the mines have a potential ability to produce bituminous coal to the amount of 18,500,000 tons weekly, or considerably over 900,000,000 tons per annum. One has merely to view this figure in the light of the maximum requirements of the country as indicated by our war experience and the assumption that our railroads can handle at least that, currently, to see that even a 20 to 30 per cent car shortage is inevitable at coal mines during a period of maximum demand for coal. That indeed has been our experience this past summer and autumn, even while production was exceeding current requirements week by week.

It is not, of course, to be contended that the mines would produce at the rate of 18,500,000 tons week by week even if the country would absorb the same, for manifestly the men could not continue maximum effort indefinitely. The point is that the failures of the carriers as shown by the reports of the coal operators are measured by a figure which reflects the maximum of productive effort in a greatly overdeveloped industry. It is significant that contemporaneously the demands for cars made upon the railroads by the same mines indicate a desire to load currently about 16,000,000 tons weekly. But even on this basis a car supply 25 per cent short would more than meet the country's needs for coal.

THE POST-ARMISTICE DIFFICULTIES

In the period following the armistice we find first, as a consequence of the industrial slump after the termination of actual hostilities, that the demand for coal fell off very quickly. There was further a seeming disposition throughout the country to utilize stocks which the Geological Survey estimates at the tremendous total of 63,000,000 tons on Armistice Day. In consequence, production which had averaged 12,000,000 tons weekly for months before the armistice, fell at once to a ten million average, and in the first six months of 1918 to eight and

one quarter million. The railroads meanwhile were carrying the greatest car surplus ever recorded in our railroad history, the maximum figure being about 450,000 of all classes of cars daily, out of a total serviceable ownership of about 2,225,000.

By June, 1920, in some producing districts and quite generally by late July, the demand for coal was again in excess of the ability of the railroads to furnish transportation therefor, and another car shortage period began. This time the fundamental causes were different from those in 1916-18, but the situation was certainly as acute. Surplus stocks had been largely consumed. The mines had been running on short time so long that there was even greater than ordinary eagerness on the part of operators and miners to get back to maximum production. The railroads had been through three war years during most of which the wheels had been all but run off their locomotives and freight cars in continuous service. Usual retirements of freight equipment and replacement by new units had been impossible for one or another war reason, while demands for empty coal cars exceeded even those of the war period. This task before the roads was rendered even more difficult in August, 1919, when employees in the railroad shop crafts began to strike. These strikes continued throughout that month and greatly militated against good service.

BITUMINOUS MINERS' STRIKE, NOVEMBER-DECEMBER, 1919

By September 1 railroad conditions were somewhat more stable, but by that time the bituminous coal miners' strike was already in sight. Plans were laid by the Railroad Administration for immediate improvement in the service for coal. A minimum production of 11,000,000 tons weekly was the mark set. It was attained in the first week of September, and consistently exceeded thereafter down to the date the strike broke, November 1, 1919. During the last two weeks of October preferential transportation for coal was accorded everywhere, even to the exclusion of other commodities, and production broke all previous records.

The advent of the strike cast additional burdens on the railroads, although the demand for coal carrying equipment immediately fell off over 60 per cent. The Fuel Administration, recalled to activity and having neither organization nor funds, proceeded to exercise its principal function, that of distribution, through the medium of the Director General of Railroads. The program for the country's protection involved the holding on wheels of some 300,000 carloads of bituminous coal in the hands of the carriers on the morning of November 1, and the rationing of the same according as needs developed. This was an exact reversal of the railroads' usual function of transportation to destina-

tion and delivery to consignee as rapidly as possible. It very effectively hindered transportation generally.

The work of the Director General in his agency for the Fuel Administration has been much criticized. To be sure, it was by no means perfect, but undertaken at a moment's notice, and handled of necessity by a nation-wide organization created by wire overnight, it hardly could be. Speaking as a member of the Director General's Central Coal Committee, the writer ventures the statement that the criticisms are based mostly if not entirely upon hindsight, and volunteers the information that the critics of history presented no concrete suggestions for improvement while the emergency was on. Even the accredited representatives of the bituminous coal producers in Washington throughout the strike were unable from day to day to furnish any dependable information with respect to the possibility of resumption of work. The same representatives who on one day would insist that settlement of the strike was in sight and that the coal on wheels could be safely released, would on the following day congratulate the Central Coal Committee for not having followed the advice previously given. Under such circumstances there was but one sound policy in the face of the rapidly declining coal reserves, as evidenced by the coal under load on wheels. That was to "play safe," and that policy was consistently followed until there was reasonable certainty that work would shortly be resumed.

Production during the strike was largely obtained in the northern Appalachian fields. Available reserves were most rapidly absorbed in Ohio and the states west to the Rocky Mountains. For their protection thousands of cars of eastern coal were moved west extraordinary distances and over extraordinary routes. Most of this eastern coal was higher priced than the coal customarily sold in that western section. The consequence was that with the cessation of the strike in sight and the possibility of cheaper production at hand, those for whose protection this coal had been moved west refused to accept it, and thousands of eastern cars were tied up under load in the west for weeks. Eventually the coal was parceled out to the railroads, the steel companies, and other large consumers who were able to utilize it.

THE SITUATION IN 1920

Although the miners' strike was settled in mid-December, only fair production materialized in the winter months of January, February, and March. It was not sufficient to accomplish more than current protection for the country, and gave no opportunity to build up the greatly depleted stocks.

Federal control of railroads terminated February 29, 1920, and pri-

vate operation in March showed progress in improved bituminous production. But in the first week of April began the outlaw strikes of the switchmen. Again production dropped to exceedingly low figures, and low marks continued for many weeks. Net ownership of coal cars by our railroads had not increased during federal control and the "bad orders" were excessive. The small stocks, estimated by the Survey as 24,000,000 tons March 1, and the extraordinary dislocation of coal cars throughout the country, a result of the heavy movement of eastern cars west during the strike, made matters worse. Car shortage figures at the mines leaped to extraordinary heights. It was early appreciated in the railroad world that a serious danger threatened the country and called for extraordinary effort to increase the facilities available for the coal transportation.

Profiting by our experience during the war, the Congress in enacting the Transportation Act, 1920, made provision that enabled the Interstate Commerce Commission to assist materially in meeting the situation. Under this legislation the Commission, whenever in its opinion an emergency exists, may authorize some departure from the cardinal principles of just, reasonable, and not unduly discriminatory practices in our scheme of transportation. Immediately upon the representation by the railroads that such an emergency as the statute contemplated did in fact exist, the Commission took active and energetic steps calculated to remedy the situation. First was an order relieving the railroads from the necessity of following shipper's routing, and simultaneously came a series of car relocation orders to bring back from the west to the coal mining territory of the east thousands of empty coal cars. Subsequently, for the further relief of the coal situation, the Commission specifically authorized preferential utilization of coal cars for coal loading. Additional emergency service orders resulted in Commission specifically authorized preferential utilization of coal moving to Lake Erie and tidewater ports for transshipment by vessel beyond, thereby avoiding car and vessel detention. Still further, in order to assure the territory beyond the Great Lakes and the people of New England of adequate coal supplies for the coming winter, specific preferences were set up for their benefit.

All these measures did, to be sure, discriminate to a certain extent against other industry, but the discrimination was only what Congress contemplated in authorizing the Commission to take action of this sort to cope with emergencies. Much as it is to be regretted that other industry had to suffer, there is satisfaction in the thought that the programs laid down have all been fully completed, and there is every indication that the coal situation in the country as a whole is in a safe condition for this winter.

In the rather harsh experience of the past four years there are these signs for the future:

1. The bituminous coal mining industry is developed far beyond the present or immediate future demands of our domestic and foreign trade in bituminous coal.

2. Our railroad facilities are probably adequate today to handle our necessary annual bituminous output produced with fair uniformity of rate throughout the year, and will certainly be adequate when post-war rehabilitation of the properties is completed.

3. Our railroad facilities are not, and without great waste of investment never can be, adequate to handle currently our necessary bituminous coal production when obtained by weekly peaks of 13,000,000 tons and valleys of 7,500,000 tons in a twelve month period, as has been the case these past two years.

4. While the powers of the Interstate Commerce Commission are sufficient to force transportation for such extremes of production, the exercise of such powers necessarily involves discrimination against other traffic and should be avoided if at all possible.

5. While our present railroad regulation can force production, it can control distribution but slightly, and prices not at all.

6. Extreme variations in rates of production not only unduly burden the transportation machine, but invite further overdevelopment of mining, with the consequence of greater irregularity in miners' working time.

7. So long as regulatory power exists to force coal production at the expense of other industry, similar power should exist to compel proper distribution of such production, should necessity therefore arise.

8. Provision should be made, by additional legislation if necessary, for the securing and compilation by proper governmental authority of current and complete statistics of production, distribution, consumption, and stocks, of bituminous coal.

To conclude, let it be kept in mind that production, transportation, distribution, and consumption, are the four big factors in the bituminous coal industry, and should be reasonably well balanced. Of course, such disturbances as war and nation-wide strikes constitute emergencies which require corresponding treatment. But under ordinary conditions proper coordination of these four big factors is possible and the result should be better conditions of mining and railroading, lower costs of production and transportation, and better prices and distribution to the consumer. These are the ends toward which we should aim.